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309 WEST JACKSON BOULEVARD • CHICAGO, ILLINOIS 60606 • (312) 922-1772
CABLE: DAMEMORE TELEEX: 2-5227

PARTNERS: JAMES B. THOMPSON • GEORGE D. LEAL
ASSOCIATE: WILLIAM G. PARATORE
CHIEF ENGINEER: RICHARD RICHARDS

June 4, 1970

Village of Park Forest
Water Department
200 Lakewood Street
Park Forest, Illinois 60466

US EPA RECORDS CENTER REGION 5



414130

Attention: Mr. Robert Enzweiler
Superintendent of the Water Department

Gentlemen:

Fifty copies of our report "Preliminary Water Supply Study, for the Village of Park Forest, Illinois" are herewith submitted.

The scope of our studies was planned in collaboration with Messrs. Robert Pierce and Robert Enzweiler with the Village of Park Forest.

The intent of this report is to assess the present status of the Village of Park Forest's Water Supply and to present alternate water supply schemes to meet the future needs of the Village. A comprehensive feasibility and comparative cost study should be performed to adequately evaluate the alternate water supply schemes presented in this report.

Should you have any questions regarding the contents of this report, please do not hesitate to contact us.

Yours very truly,

DAMES & MOORE

William G. Paratore

WGP:WDP:aw

PRELIMINARY WATER SUPPLY STUDY
FOR THE
VILLAGE OF PARK FOREST, ILLINOIS

INTRODUCTION

The Village of Park Forest derives its entire municipal water supply from seven wells ranging in depth from 350 to 400 feet below the ground surface. Periodic measurements of the static water levels in the Village water supply wells over several years indicate a progressive decline in the static water levels.

The Village now has an adequate water supply to meet its current demands. However, declining water levels, projected regional population increases accompanied by greater demand for water and possible increase in industrial use of ground water, will greatly influence the Villages present source of water supply causing it to become inadequate. The Village of Park Forest therefore requested that this study be made of potential water supply schemes which could be considered for possible future use to supplement or replace the present water supply system.

This report presents an evaluation of Park Forest's present ground water supply, including a discussion of the reasons for declining water levels in existing wells and possible future effects continuing declines will have on the Village water supply system. Other potential water supply sources and preliminary recommendations for feasible long-term water supply schemes are included in this report.

GROUND WATER AQUIFERS

GENERAL

A ground water aquifer is defined as a geologic formation or series of formations from which usable water can be obtained in sufficient quantities to be of value. There are two principal ground water aquifers underlying the Park Forest area. These are known locally as the Shallow Dolomite and Deep Sandstone aquifers. All seven existing Park Forest wells are completed in and obtain water from the Shallow Dolomite aquifer.

SHALLOW DOLOMITE AQUIFER

Several dolomite (similar to limestone) rock formations within the Niagaran, Alexandrian, Cincinnati and Mohawkian geologic series constitute the Shallow Dolomite aquifer. The top of this aquifer is present approximately 100 feet below the ground surface and extends down to a depth of about 400 feet.

Wells in this aquifer obtain water which migrates through fractures and solution channels within the dolomite rock. Wells completed in the aquifer produce from a few gallons of water per minute to more than 1,000 gallons per minute depending on the extent and number of fractures and channels at a particular well site.

DEEP SANDSTONE AQUIFER

Two major sandstone groups comprise the Deep Sandstone aquifer. These groups include the Glenwood-St. Peter and Iron-ton-Galesville formations. The top of the Deep Sandstone aquifer is present approximately 900 feet below the ground surface in the Park Forest area and extends to about 1,800 feet.

Water migrates into wells completed in this aquifer through voids between sand grains and fractures within the rock mass. Properly constructed producing wells yield from 500 to 1,500 gallons of water per minute from this source.

OVERDRAFT OF AQUIFERS

When the rate of ground water removal (draft) exceeds the rate of water entering an aquifer (recharge), a condition of overdraft exists. If this condition of overdraft or mining of water continues, the aquifer will eventually be depleted. Not all of the water stored in an aquifer can be removed by pumping wells but a point will be reached where well yields from the aquifer will be reduced to a quantity insufficient to be of value as a water supply source. As this point of depletion is approached, irreversible damage occurs within the rock formations and eventually the size of fractures, channels and even the voids between sand grains can be greatly reduced. This reduction in water passage size may no longer allow transmission of water to wells at rates high enough to meet the requirements of an aquifer as defined above.

One of the characteristics of an aquifer that is in a condition of overdraft is a steady decline of the static water levels over the entire aquifer for an extended period of time. Seasonal fluctuations in water levels are normal but continual yearly declines are indicative of serious aquifer depletion.

According to the Illinois State Geological Survey, both the Shallow Dolomite and Deep Sandstone aquifers underlying the Park Forest area have been in an overdraft state for the past several years. Total draft from both of these ground water sources has increased yearly thus increasing the rate of aquifer depletion. As forecast by the State of Illinois and local officials,

the projected population increases and resulting increased water demands will continue to accelerate aquifer depletion in the Park Forest area as well as the surrounding region.

Municipal and industrial wells in the Park Forest area withdraw approximately 21,000,000 gallons of water per day from the two principle aquifers and during peak demands, withdrawal probably approaches 30,000,000 gallons per day. More than 90 percent of this water withdrawal is from north of Park Forest.

It should be clearly understood that the depletion of both the Shallow Dolomite and Deep Sandstone aquifers is a regional problem and involves the combined water withdrawal of all individual, municipal and industrial users obtaining water from these aquifers. Any one user alone would have little affect on total aquifer overdraft. An area of large withdrawal from closely spaced wells could cause local depressions in static water levels of surrounding areas but would not be responsible for continual annual declines in static water levels. Based on reports from local officials, declining water levels have been noted in wells in all areas where the Shallow Dolomite and Deep Sandstone aquifers are used for water supplies.

Water level records kept by the Village of Park Forest for the past 20 years indicate a continual decline in the water level in the Village wells founded in the Shallow Dolomite aquifer. The rate of decline has increased during the past 10 years of record. Figure 1 illustrates the rate of water level decline in the Village wells. The rate of decline in the Village water supply wells has varied from a low of 1.3 feet per year (Well No. 2, 1947 to 1955) to a high of approximately 6.6 feet per year (Well No. 2, 1962 to 1967).